

Problem FIBNUMS: Fibonacci Numbers

Fibonacci numbers can be viewed as an excellent example of recursively defined sequences. Given the construction rule $F_{n+1} := F_n + F_{n-1}$ and the initial values $F_0 = 1, F_1 = 1$, one can easily compute the Fibonacci number for any given index n . Fibonacci numbers play an important role in many different areas of science.

Hardware tests are one possible application: For a set of index numbers $n_0 \dots n_k$, a computer has to calculate the appropriate Fibonacci number. Those calculations might take several hours, and if the computer finally prints the correct value, one can be quite sure that at least the ALU seems to work correctly.

Since Fibonacci numbers grow quite fast (they happen to have, indeed, an exponential growth with respect to the index number n), and there is not enough memory to e.g. compute F_{10^9} , we will calculate Fibonacci numbers modulo a given number m .

Input

In the first line of the input file, there is an integer number n , indicating the number of test cases that will follow. In each the following n lines, there will be two integer numbers, j and m , stating that you have to compute the j 'th Fibonacci number modulo m : $F_j \bmod m$. The numbers j and m are separated by a single space. There are no blank lines in the input.

It is guaranteed that in each line the index number j will be non-negative and smaller than 1000000000, while the modulus m will be at least 2 and no bigger than 30000.

Output

For each input line (except the first, of course), print a corresponding line containing only the Fibonacci number that is asked for: $F_j \bmod m$.

Sample Input 1

```
6
0 2
1 10
20 37
1001 147
117117 12345
567918361 777
```

Sample Output 1

```
1
1
31
139
8069
223
```